



Friends of Congaree Swamp News

Cherrybark oaks gems of the forest

By John Cely

In a forest of remarkable trees, Congaree National Park's cherrybark oaks (*Quercus pagoda*) are standouts among the standouts.

With its massive buttressed trunk, anchored by huge radiating flukes, soaring columnar trunk, and tremendous crown spread (some approaching or exceeding 100 feet), the cherrybark oak commands attention like no other tree in the park, except perhaps virgin bald cypresses.

It is by far the largest hardwood species in the Congaree, with the current state champion, and possible national co-champion, having a circumference at breast height of 25.6 feet. According to the Native Tree Society, one Congaree cherrybark oak

measured 160.2 feet high, the tallest oak tree ever measured in North America! Unfortunately this record-setting tree, now lying across the eastern leg of the Oak Ridge Trail, blew down in a wind storm some ten years ago.

Cherrybark oaks are found only on the highest and best-drained ridges and terraces within the Congaree floodplain. They are a characteristic tree of the riverfront or levee forest and reach greatest densities in those locations.

Away from the levee forest they are found in fewer numbers on the higher ridges and along the banks of guts, sloughs, oxbow lakes, and old river channels. Like sweetgums, cherrybarks seem to miraculously appear as medium to large trees without ever going through a seedling/sapling stage. Also



Cherrybark Oak

like sweetgums, they require a fairly large opening or clearing in the forest with abundant sunlight to become established.

These conditions are created naturally at the park by very strong winds, such as those from Hurricane Hugo, or artificially through old clearings and abandoned fields within the floodplain. The seedlings

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President's Corner

Dr. John Grego

Land acquisition

Congaree National Park is 100.77 acres bigger and \$410,000 poorer with the September 21 purchase of the Two Rivers Farm tract. We described the park's interest in the tract in our Spring 2017 newsletter after the park published a Federal Register notice in March 2017 of its intent to seek a boundary expansion. In March of 2018, the approved boundary expansion was published in the Federal Register, allowing the Department of Interior to move forward with the purchase.

The new property completes the park's acquisition of Bates Old River's shoreline, and will allow unified management on this important waterway. The property includes some important cultural sites that should be further researched, including the site of McCord's Ferry on the northern bank of Bates Old River. The unimproved boat ramp to Bates Old Ferry flanks the western edge of the property and we still have hopes that the access road and ramp will be upgraded, which will greatly improve access to Bates Old River and the new acquisition.

Rebecca Sharitz

Friends of Prof. Rebecca Sharitz were heartbroken to learn of her passing on October 20 of this year. Becky died suddenly at her Aiken home from complications due to a brain injury sustained after a serious fall 18 months ago, preceded by an earlier hip injury. Becky was an

internationally renowned wetlands ecologist with a joint appointment at University of Georgia and the Savannah River Ecology Laboratory. She treasured Congaree National Park, and gave generously and unconditionally to research efforts at the park.

One of Prof. Sharitz's students, Dr. Neil Pederson of Harvard Forest, has posted a remembrance on the blog he manages, The Broadleaf Papers, and another former student, Prof. Loretta Battaglia of Southern Illinois University, will be sharing remembrances in the newsletters of

three professional societies in which Prof. Sharitz took important leadership roles. Friends of Congaree Swamp shared Dr. Pederson's tribute on our Facebook page, and will be sharing Prof. Battaglia's tributes as we receive them.



Prof. Rebecca Sharitz

Becky's research at the park led to my very first volunteer experience at the park. I was part of a group that helped Becky's team in 1990 as they laid out one of the post-Hugo vegetation plots that became the most ambitious field study ever undertaken at the park. I mostly remember Becky for her drop-everything attitude when it came to Congaree National Park, irrespective of her stature in the field or ongoing commitments.

We benefited most particularly when Becky pitched in on short notice to help then-park resource manager Bobbi Simpson with the successful proposal for the Learning Center back in 1998. The construction of the center transformed research at the park, creating a suitable field lab and lodging for park researchers, while establishing a couple positions at the park that directly supported research and education.

Friends of Congaree Swamp awarded the Order of the Cypress to Prof. Sharitz in 2007, recognizing her as one of the most influential contributors to the park since its establishment. We are profoundly grateful for everything she did for the park.

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Friends of Congaree Swamp advocates for Congaree National Park and its unique environment.

Dr. John Grego, President

Sharon H. Kelly, Editor

Friends files Westinghouse FOI request

The recent leak of radioactive materials at the Westinghouse plant revealed other ongoing problems and stirred up a hornets' nest of safety concerns related to the plant. Friends of Congaree Swamp discussed groundwater contamination at the site in our Fall 2016 newsletter, and decided to file another Freedom of Information Act request to update our knowledge of site conditions.

The radioactive leak occurred within a diked "spiking station" where hydrofluoric acid is mixed with uranium salts as part of the fuel enrichment process. While investigating a suspected leak from the dike, inspectors removed a liner and noticed a crack in the coating of the concrete floor of the dike that grew worse as the crack was investigated.

As you likely read in *The State*, concentrations of uranium over 4000 ppm were sampled from the soil under the containment floor. Interestingly, the highest reading was recorded at the lowest level (67 inches deep) of the test hole! Testing stopped once a clay soil layer was reached, and Westinghouse was likely worried that this impermeable layer may be breached with further sampling.

Westinghouse's initial proposal to remediate the issue was quite complacent. They argued that an existing monitoring well almost 190 feet from the site of the



Westinghouse Nuclear Fuel Plant

leak would be sufficient for monitoring purposes. As the S.C. Department of Health and Environmental Control pointed out in requesting a sampling plan to study the leak, it would take over a year for that well to detect any possible groundwater contamination from the leak.

Prior to discovering this incident, Westinghouse shared news of two previous unreported leaks of radionuclides in 2008 and 2011 along a contaminated wastewater line that runs through the middle of the plant. Westinghouse replaced the line after the 2011 incident, and now proposes to collect soil samples to further study any other releases from the line.

Our earlier study focused mostly on the sources of groundwater contamination on-site, which is now monitored by two different DHEC departments based on

the different sources of the contamination—the wastewater treatment system and an as-yet-identified source.

Recent studies of chlorinated volatile organic compounds (CVOC's) confirm the presence of two large groundwater plumes, one originating from the wastewater treatment system and moving south toward Sunset Lake, which is part of Mill Creek, and another moving west-southwest. Earlier reports indicated that the second plume may be linked to a former oil house on the property, but a December 2017 report indicates the source is unknown.

The study of these sources of groundwater contamination is being managed under a Voluntary Clean-up Contract dating to August 2016. The contract requires monitoring and assessment of groundwater

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Congaree welcomes new superintendent

ATLANTA – The National Park Service (NPS) has selected K. Lynn Berry as the next superintendent to lead Congaree National Park.

Berry currently serves as the Chief of Community Assistance and Partnerships for the NPS National Capital Region. She will assume her new duties at Congaree on November 11.

“K. Lynn has a remarkable background in community and environmental planning, as well as cultural resource management and public involvement processes,” said Southeast Regional Director Bob Vogel. “She is a collaborative manager and we are excited to have her leadership at Congaree National Park.”

Berry joined the NPS in

2010 and has served as the National Heritage Area program manager, Southeast Region centennial coordinator, and acting superintendent of DeSoto National Memorial.

Previously she worked in federal and state government, as well as private consulting. She has a bachelor’s degree and master’s degree in cultural anthropology and a master’s degree in city and regional planning.

“I very much look forward to supporting the team at Congaree in connecting with our communities and visitors and preserving the magnificent old growth bottomland forest,” said Berry.

“The big trees, the enriched floodplain, and outstanding waters of the park are

known to many as national treasures. I share the awe that visitors experience as they enter the wilderness, impressed by biodiversity, and reverential in the presence of those champion trees.”

Berry, a native of Arkansas, attended the University of Notre Dame before working in Chicago, Florida, Denver, Albuquerque, Atlanta, and Washington, D.C. She loves to travel and has toured many African, Asian, European, Central-, South- and North American countries. She’s an avid paddling enthusiast and is excited to experience the Congaree and Wateree Rivers and Cedar Creek. Berry and her partner Lynn-Margaret look forward to exploring the South Carolina Midlands.

Save the date

This year’s Congaree Swamp Christmas Bird Count will be held Sunday, Dec. 16, beginning at 7 a.m.

Christmas Bird Counts, conducted each year since 1900, are the oldest citizen science project in the country. A CBC is an all-day effort to find and identify as many wild birds as possible within a 15-mile diameter circle.

This effort, which now includes more than 2,500 circles and about 70,000 participants annually, is sponsored by the National

Audubon Society. Results may be reviewed at www.audubon.org/conservation/science/christmas-bird-count.

The Congaree Swamp CBC, founded by Robin Carter, includes almost all the national park and adjacent areas, from Gadsden in Richland County to Fort Motte and St. Matthews in Calhoun County.

The Congaree Swamp CBC often has among the highest counts in the country of Pileated Woodpecker, Northern Flicker, Yellow-bellied Sapsucker, Barred Owl, Winter Wren and others.

Join us to help out. If

you are a novice, an expert birder will lead you around the boardwalk and Bluff Trail in the morning, which together host some of the park’s best sites for interesting wintering species and permanent residents.

Experienced birders can participate in one of our many parties spread throughout the circle. Parties assigned to the main trail system will meet at the visitor center parking lot.

If interested, please contact John Grego at 803-331-3366 or email friendsofcongareeswamp@gmail.com.

Annual meeting enjoys pleasant fall day

A muddy and occasionally bumpy road to our meeting site at Richland County's Mill Creek tract belied the pleasant conditions upon arrival.

We last visited in 2010 when the property was owned by the Mill Creek Hunt Club. Richland County purchased part of the tract (Upper Mill Creek) in 2014 using stormwater funds to establish a mitigation bank, and another part of the tract (Lower Mill Creek) in 2016 through Conservation funds to preserve floodplain property. The lodge and grounds were in great shape, due to the hard work of the Richland County Conservation Department, with a special nod to its new land program planner, Chris Hansen.

Friends members split into two groups: John Cely led a car caravan to Goose Pond, while Conservation Department Director Quinton Epps led a tour of mitigation sites on the tract. John was a member of the hunt club back when the Claytors owned the property

(known locally as Claytor Swamp) and shared special sites near Goose Pond, including agricultural dikes constructed by enslaved African-Americans. The eponymous story in *Tales of Congaree* details both human and animal hauntings, though the sighting that most attracted participants' interest was a fly-by Bald Eagle.

Epps' group walked to a couple mitigation sites, including a dam removal site, and a tract of loblolly pine that was cut and replanted in bottomland hardwood species. His group then caravanned to a stream channel that had been restored and revegetated.

We reconvened for our business meeting, and Epps spoke briefly about the county's motivations for acquiring the tracts. After acknowledging park guests, we re-elected current board members Andy Fiffick, Kevin Fisher, Kate Hartley, Sharon Kelly, Dennis Poole, and Dick Watkins to 3-year terms by acclamation.



Quinton Epps

The Oyster Bar roasted excellent oysters from the James River. Andy Fiffick barbequed chicken leg quarters while Friends members supplied snacks, chili, roast vegetables, and desserts.

We would like to thank our volunteers Mary Bull, John Cely, Blaney Coskrey, Kate Hartley, Stuart Greeter, Rhonda Grego, Sharon Kelly, Sara McGregor, Jill and Neal Polhemus, Dennis Poole, Clover Robichaud, Claire and Dave Schuetrum, Philoma Skipper, Bill Stangler, Alice Steinke, Ted Steinke, and Virginia Winn.

Westinghouse

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contamination, with a conclusive study of remedial alternatives, which could result in no direct remediation of the contamination at all, but perhaps only continued monitoring.

All this occurs within a much larger context in which Westinghouse seeks a renewal

of its license from the Nuclear Regulatory Commission, and Lower Richland residents are requesting testing of their drinking water wells for possible contamination.

All indications from 30 years of groundwater testing are that contamination moves away from populated areas and toward Mill Creek; testing of private wells is timely regardless to ensure peace

of mind of local residents. The renewed attention has already had a direct benefit, since the NRC will re-open the environmental assessment needed for the license renewal. The previous assessment had escaped the notice of all the local environmental groups, and this will be an excellent opportunity to share our concerns based on our study of the public record.

Cherrybark

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seem to have fairly exacting requirements for survival, and the young trees probably don't do well with much competition from other hardwood species. Once established, however, cherrybarks grow quickly and are perhaps the fastest growing of Congaree's oaks. I suspect the very large specimens in the park are between 150 – 200 years old.

Because of their large size, mushroom-shaped, top-heavy profile and shallow root system, cherrybark oaks are susceptible to wind throw. Within the past 15 years or so, a number of cherrybarks have succumbed to high winds, and in some cases have toppled without any assistance from wind.

For example, on the Oakridge Trail, three cherrybarks noted in Robert Jones' Draft Final Report "Location and Ecology of Champion Trees in Congaree Swamp National Monument, 1996," have fallen within about the past ten years. More recently, a cherrybark was blown down by Hurricane Matthew in October, 2016. And a large 17.2-foot-circumference oak on the trail by Hammond's Gut fell over in the fall of 2015, apparently as a result of water-logged and softened soils from record October flooding.

As these forest giants have fallen, an immediate question is, are the replacements going to be as big as their predecessors? And what are the current conditions and

size-frequency distributions of Congaree's cherrybark oak population? Knowing this information can also be useful as a baseline to evaluate future changes in Congaree's cherrybark oak population.

In the spring and early summer of 2017 I surveyed Congaree's cherrybark oaks along the River, Weston Lake Loop, Kingsnake, and Oak Ridge trails. The total length surveyed of these four trails came to 13.0 miles, with the River Trail being 4.7 miles; Weston Lake Loop, 1.8; Kingsnake, 3.5; and Oak Ridge, 3.0 (These figures do not represent the full length of each trail.)

All cherrybark oaks within 100 feet on either side of the trail were measured for circumference at 4.5 feet high using a steel forester's tape and their latitude and longitude recorded with a GPS. Notations were made of any noticeable tree damage, missing or damaged major limbs, and other external features that could affect the tree's health. In order to provide a limited time frame of tree mortality, down and dead cherrybarks dating back roughly one year to the spring of 2016 were measured and located with a GPS.

I found 133 live cherrybark oaks on 13 miles of trails, a density of 10.2 trees per mile. The highest density of trees was found on the River Trail, with 14.5 trees per mile, followed by Weston Lake Loop at 9.4 trees per mile; Kingsnake at 7.4 per mile; and Oak Ridge at 7.3 trees per mile. The mean

circumference for the 133 live trees was 9.0 feet, with a maximum circumference of 22.1 feet and a minimum of 1.5 feet. Mean oak circumferences for the four trails varied from 8.6 to 10.6 feet. The latter figure was for the Oak Ridge Trail and was statistically significantly larger than those on the other three trails.

Nine cherrybarks were downed in 2016, all toppled by strong winds from Hurricane Matthew on October 9, 2016. The mean circumference for the downed trees was 9.7 feet, slightly larger than the mean size of live trees (9.0 feet), but not statistically significant. This suggests that the location of the tree was more important as far as its being blown down rather than its size—six of the nine were on the Oak Ridge Trail, an area that appeared most affected by wind damage.

How does the current crop of large cherrybarks compare in size to past trees and those predicted for the future? The average circumference for the five largest cherrybarks found on the four trails from the Jones report was 19.7 feet. In 2017, 23 years later (1994 was used as the measurement year for the trees in the Jones report), the largest five trees averaged 19.3 feet and notably, three of the largest five trail trees in the Jones report are now dead. When looking ahead 20 years from 2017, to 2037, the average circumference for the five largest cherrybarks on the four trails is predicted to be 18.7 feet, statistically

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smaller than the current trees. And none of these five trees is predicted to be any bigger than 19.4 feet in circumference.

Two assumptions were made for these predictions: Two trees, currently measuring 21.0 and 22.1 feet in circumference, are predicted to be dead in 2037, a reasonable expectation based on mortality rates from the Jones report. Secondly, growth rates of cherrybark oaks have reported to be “3 to 6 inches of diameter growth in 10 years.” I measured three of the surviving oaks noted by Jones. Diameter growth rates per 10 years were found to be 3.6 inches, 3.7 inches, and 2.4 inches, respectively. I used 3 inches of diameter growth per 10 years to arrive at the year 2037 cherrybark oak predicted circumferences.

The size-frequency distribution for the 133 oaks is shown in the graph. It is heavily skewed towards a preponderance of medium-size individuals, followed by a sharp reduction to a few large and very large individuals and with few young trees in the recruitment stage. The graph indicates that cherrybark oaks at Congaree go through what appears to be a “boom and bust” cycle whereby a few

good years of seedling survival and growth are followed by relatively long periods of poor reproduction and recruitment. This pattern also fits the most common species of hardwood in Congaree’s bottomland hardwood community, the sweetgum.

With such low recruitment, cherrybarks along the trail

8-10 feet circumference class, representing 22 percent of the sample, suggests in fact that this size cohort, presumed to be 75-100 years old, was established within this interval. And the weather events that create openings in the forest canopy could actually be multiple occurrences over a relatively short period of time rather than one single episode.

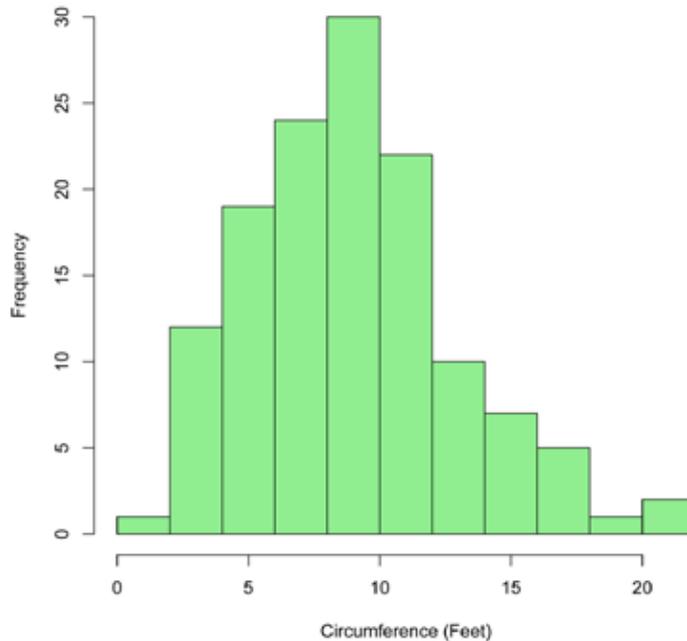
Since cherrybarks are by far most abundant along the riverfront or levee forest, conditions that allow them to flourish there may be different than in the floodplain interior. In addition to having the highest and best-drained soils, the riverfront has more sunlight, all of which may allow for a more regular production of oaks than in the interior.

However, since the river front is subjected to windier conditions, as well as continuous scouring

and undercutting of the riverbank, the oaks here do not appear to live long enough to attain very large size and championship status.

Regardless of the number and size of individual trees, there should always be big specimens of cherrybark oaks at Congaree to inspire and impress visitors. And like sweetgums and loblolly pines, I feel it’s not too big a stretch to claim that Congaree supports the finest cherrybark oak forest in the world.

Frequency Distribution of Cherrybark Oak



system could eventually decline to the point that the species becomes even less common than it is now. However, hurricane-force winds that are strong enough to knock down groups of trees in the Congaree rather than individual trees (the conditions that create cherrybark and sweetgum regeneration) periodically sweep through the Midlands at perhaps 50-to-100-year intervals (think Hurricane Hugo). The large number of cherrybarks currently in the



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*For a contribution of \$35 or more, you may choose one:

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Tan visor _____

Bandana with map of Congaree National Park gold _____ blue _____ red _____

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Thank you for supporting Friends of Congaree Swamp!

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